HPV

Vaginal self sampling versus physician cervical sampling for HPV among younger and older women

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Objectives: To estimate the agreement between self collected vaginal swabs and physician collected cervical brush samples for detection of oncogenic human papillomavirus infection (HPV) by the hybrid capture 2 (HC-2) test among women younger and older than 50 years, and to assess women's preference for sample collection method based on age.

Methods: Consecutive women aged 15–49 years due for a 1 year visit in a prevalence study of carcinogenic HPV and a new sample of women aged 50 years and older attending their family physicians for cervical screening, in Ontario, Canada, performed vaginal self sampling and underwent physician cervical sampling and cervical cytology. Women completed a self administered questionnaire on demographics and preference for sampling method.

Results: Among the 307 women aged 15–49 years, the prevalence of HPV was 20.8% (64/307) and 17.6% (54/307) in the vaginal and cervical specimens, respectively. Among the women aged 50 years and older, prevalence was 9.9% (15/152) and 8.6% (13/152), respectively. Kappa for agreement between sample collection methods was 0.54 for the younger and 0.37 for the older women (both $p<0.001$). Nearly half of the women preferred self sampling or had no preference.

Conclusions: There was fair agreement between self collected vaginal and physician collected cervical specimens for detecting carcinogenic HPV in younger and older women. Vaginal sampling for HPV appears to be promising as a primary screening strategy for cervical cancer prevention programmes in low resource settings in developed and developing countries.

Persistent cervical infection with carcinogenic types of human papillomavirus (HPV) is responsible for virtually all cases of cervical intraepithelial neoplasia,[1] and invasive cervical cancer.[2] HPV testing has been recommended as a primary screening method where universal cytology programmes are not feasible or subgroups of women are difficult to reach via traditional screening programmes.[3] In developed countries some groups of women remain underscreened, including older women.[4 5] In the United States and Canada, approximately two thirds of invasive cervical cancers occurred in women who had never been screened or were not screened at the appropriate intervals,[6 7] and in developing countries, where over 80% of the burden of illness resides, the vast majority of women have never been screened.[3]

HPV testing allows for the use of vaginal samples, offering women the potentially more acceptable option of self collection. Studies in both developed and developing countries have reported the acceptability of vaginal self sampling over physician cervical sampling,[8 9] but most have only included women younger than 50 years of age.

In a population based survey of carcinogenic HPV prevalence among younger and older women in Ontario, Canada, we examined the concordance between HPV DNA in physician obtained cervical and self obtained vaginal samples, and women's preferences for collection method according to their age.

METHODS

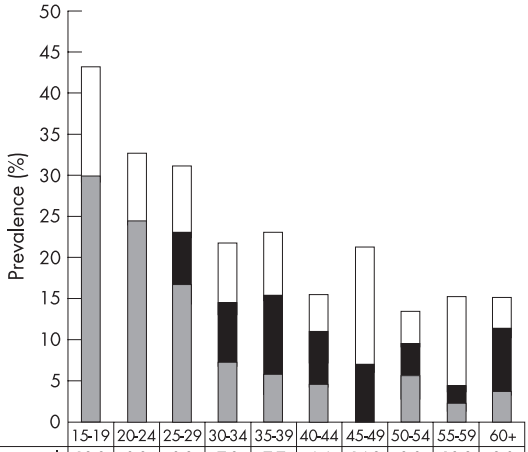
Thirty one family physicians invited women 15–49 years of age for follow up HPV testing on their return for annual cervical cytology (July 1999 to May 2000), based on their HPV status in an earlier prevalence study.[10 11] All women were eligible if they were HPV DNA positive a year earlier using a physician collected cervical swab, by HC-2 (Hybrid Capture 2 assay, Digene Corp, Gaithersburg, MD, USA). In addition, a random sample of women was selected from an HPV negative cohort (by both HC-2 and the polymerase chain reaction assay). Twelve of the 31 participating physicians also agreed to recruit randomly selected women 50 years of age and older when they presented for annual cervical cytology; an additional three practices were recruited to accelerate recruitment in the older age group. Physicians were stratified to geographically represent the province of Ontario. The research ethics committee of St Joseph's Healthcare, Hamilton, approved the studies.

In private, each woman provided a self collected vaginal swab using a plastic shafted Dacron swab, as previously described.[8] A vaginal speculum was then inserted and following a Papanicolaou (Pap) smear, the physician used a brush sampling device (Cervical Sampler, Digene Corp) to take a cervical sample for HC-2 testing. The vaginal sampling was always done before cervical sampling. Women self completed a questionnaire that asked about their preference for vaginal self sampling versus physician cervical sampling using a five point Likert scale. The vaginal and cervical specimens were tested using the HC-2 assay for carcinogenic types of HPV as previously described.[8] The prevalence of carcinogenic HPV DNA was calculated for physician collected and self collected samples overall and in 5 year age cohorts, and agreement between the two methods was assessed using the kappa statistic.[8] Sociodemographic and behavioural factors were entered into a backwards stepwise logistic regression to explore predictors of strongly preferring self sampling.

RESULTS

Four of the 31 practices recruiting women 15–49 years dropped out, leaving 543 women who were eligible for follow up and self sampling. Of these, 318 women attended for follow up and 307 provided usable vaginal and cervical swabs

Abbreviations: HC, hybrid capture; HPV, human papillomavirus; Pap, Papanicolaou



	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
□Vaginal positive only	13.3	8.2	8.3	7.3	7.7	4.4	14.3	3.8	10.9	3.8
■Cervical positive only	0	0	6.3	7.3	9.6	6.7	7.1	3.8	2.2	7.5
▩Both positive	30	24.5	16.7	7.3	5.8	4.4	0	5.7	2.2	3.8

Figure 1 Prevalence of carcinogenic types of HPV DNA by HC-2 assay by vaginal self collected and cervical physician collected swabs by 5 year age group in 459 women aged 15–80 years.

and completed the questionnaire. Among the 156 women aged 50 years and older who were approached, 152 provided both samples and completed the questionnaire. Most participants were married or in a common law relationship.

The overall prevalence of carcinogenic HPV was 17.6% (54/307) and 20.8% (64/307) by the cervical and vaginal swabs, respectively, in the younger group, and 8.6% (13/152) and 9.9% (15/152) in the women aged 50 years and older.

Figure 1 shows the prevalence by age for infections detected by both collection methods, vaginal swab alone, and cervical brush alone. Among the younger women, the cervical brush sample was positive for 7.0% (17/243) of the negative vaginal swabs, and the vaginal swab sample was positive for 10.7% (27/253) of the negative cervical swabs. Overall agreement in the younger group was 85.7% (263/307) and kappa was 0.54 ($p<0.001$; 95% CI 0.42 to 0.66). Among the women aged 50 years and older, the cervical swab sample was positive for 5.1% (7/137) of the negative vaginal swabs, and the vaginal swab sample was positive for 6.4% (9/139) of the negative cervical swabs. Overall agreement in the older group was 89.5% (136/152) and kappa was 0.37 ($p<0.001$; 95% CI 0.13 to 0.62).

Among the younger women, 46.2% (138/299) preferred self sampling or had no preference, and this was similar in the older group (47.9%; 69/144) ($p = 0.63$). Age, marital status, number of lifetime partners and partners in the previous year, current use of oral contraceptives, age at first intercourse, number of children, and current smoking were not associated with strongly preferring self sampling.

DISCUSSION

This study used randomly selected physicians and patients, and included women ranging in age from 15–80 years old, to investigate vaginal compared to cervical samples for detecting HPV DNA, and women's preference for collection method.

Our results confirm some previous findings of a higher prevalence of carcinogenic HPV infection in self collected vaginal compared to physician collected cervical samples.[12 13] This may be explained, at least in part, by cross reactivity of the HC-2 test with non-oncogenic types that may be more frequently present in the vagina compared to the cervix.[14] It is also plausible that high risk types of HPV are present in the vagina and not in the cervix; however, in a previous study, an increased prevalence of high risk types of HPV in vaginal samples had no consistent association with the presence of histologically proved cervical neoplasia.[8] There was no statistically significant difference in agreement between vaginal and cervical sampling sites in the younger compared to older women.

Comparisons of prevalence rates with other studies should be made with caution since the younger women participated in this study if they were HPV positive in the first study, or randomly selected from a group of previously HPV negative women. The fact that vaginal specimens were always obtained before cervical specimens, thus preventing an analysis of order effect, is another potential limitation.

A significant proportion of women preferred physician sampling, perhaps because this was a primary care population accustomed to a routine physical examination and Pap smear. Women's responses may be confounded by a pre-existing belief that cervical cytology is superior to the relatively new HPV test, or that self sampling may not yield as satisfactory a sample as that obtained by their physician.[9]

Women who are older have been identified as less likely to utilise cervical cytology,[4 5] possibly because of a belief that they are at lower risk. Although the incidence in women over the age of 50 is low when cytology history has been normal, the presence of HPV type 16 has been shown to be an independent predictor of cervical cancer.[15 16] Self sampling for HPV may be an effective and acceptable screening approach for older as well as younger women,[17 18] especially those who dislike vaginal speculum examination.

CONTRIBUTORS

TK was involved in the conduct of the earlier study of HPV prevalence, handled data collection, and contributed to a first draft of the manuscript; MH contributed expertise in self sampling for HPV, was involved in analysis and interpretation of data, and contributed to a first draft of the manuscript; JWS was involved in conception and design of the study and interpretation of data, and critically revised the manuscript for important intellectual content; JK contributed to the study design and critically revised the manuscript for important intellectual content.
All authors approved the final version of the manuscript submitted for publication.

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